# ARIZONA GAME AND FISH DEPARTMENT
# HERITAGE DATA MANAGEMENT SYSTEM

**Animal Abstract** **Element Code:** AFCJB13100
**Data Sensitivity:** No

## CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

**NAME:** *Gila elegans*
**COMMON NAME:** Bonytail Chub, Bonytail
**SYNONYMS:** *Gila emoryi, Gila robusta elegans*
**FAMILY:** Cyprinidae

**AUTHOR, PLACE OF PUBLICATION:** Baird and Girard, Proc. Acad. Nat. Sci. Phila. V. 6: 369. 1853.

**TYPE LOCALITY:** Zuni River (now dry), New Mexico, U.S.A. [but probably Little Colorado R., below Grand Falls, Coconino Co., Arizona, U.S.A. (CAS 2004).

**TYPE SPECIMEN:** USNM – 20079 [orig. USNM 251] plus 1 pharyngeal arch.

**TAXONOMIC UNIQUENESS:** There are 14 species in the genus, 7 of which are in Arizona. *Gila elegans* is considered a full species. It has also been considered as a subspecies and an ecotype under *Gila robusta*.

**DESCRIPTION:** Bonytail chub generally reach 300 to 350 mm (12-14 in.) in total length, although larger specimens of up to 600 mm (24 in.) have been taken from Mohave and Havasu lakes, Arizona. They have a highly streamlined body that arches smoothly into a predorsal hump in adults. The skull is concave on the dorsum. Total vertebrae are 47-50. Its caudal peduncle is thin and pencil-like. Squamation sometimes incomplete, with scales absent or highly embedded on predorsum, venter, or caudal peduncle. Fins large, falcate, with origin of dorsal nearer tip of snout than to caudal-fin base. Dorsal fin rays almost always 10 or more; anal fin rays usually 10. Mouth terminal and somewhat oblique. Dorsal and ventral rami of pharyngeal arches about equal in length, teeth 2, 5-4, 2 (Minckley 1973).

Color dark above and light below, very dark (almost black) when from clear waters, or pallid when from turbid streams. Fins often dusky, with yellow pigment near bases, especially paired fins (Minckley 1973). Breeding males have bright red-orange lateral slashes between the paired fins (similar to other closely related chubs), and small tubercles on the head and anterior portions of the body. Breeding colors are more subdued and tubercles less well developed in females.

**AIDS TO IDENTIFICATION:** A combination of characters, are used to differentiate adult bonytail, humpback (*Gila* cypha), and roundtail *(Gila robusta*) chubs. Dorsal/anal fin-ray counts are usually 10-10 in bonytail chub, 9-9 in roundtail chub, and 9-10 in humpback chub.

The number of gill rakes on the anterior row of the second arch is usually 18 (15-21) in bonytail chub, 15 (13-17) in humpback chub, and 13 (12-15) in roundtail chub (R. Muth in USDI, FWS 1980). Bonytail chub have a much narrower caudal peduncle than roundtail chub with the ratio of head length to caudal peduncle depth generally greater than five. The nuchal hump in adult bonytail chub rises smoothly from a concave skull, while those of adult humpback chub arise more abruptly from the skull (USDI, FWS 1990).

**ILLUSTRATIONS:** B&W photo (Minckley 1973:95)
Photo (Minckley and Deacon 1991:209)
Color drawing (Page and Burr 1991:74)
Color photo (Rinne and Minckley 1991:34)
B & W photograph (Wildlife Habitat Management Staff Group 1975:143)

**TOTAL RANGE:** Once widely distributed throughout the Colorado River and its main tributaries, to include the Green River in Utah and Wyoming, and the Colorado, Gila, Salt, and Verde rivers in Arizona. Currently found only in isolated populations in the Yampa River, Green River, Colorado River at the Colorado/Utah border, and at the confluence of the Green and Colorado Rivers. In the lower basin, found only in Lake Mohave with possible individuals between Parker Dam and Davis Dam.

**RANGE WITHIN ARIZONA:** A small population exists in Lake Mohave, with possible individuals downriver as far as Parker Dam.

## SPECIES BIOLOGY AND POPULATION TRENDS

**BIOLOGY:** The smaller, reduced or embedded scales and relatively smaller eyes of these fishes may be adaptations to the high silt loads which characterized the remarkably erosive, turbid Colorado River systems prior to constraint of dams (Minckley 1973). Individual bonytail chub that inhabit lakes of the lower Colorado River, retain their streamlined body shape, and apparently occupy an active, limnetic niche in the reservoirs. Many specimens, identified as bonytail from the upper Colorado River basin, show some evidence of hybridization with roundtail or humpback chubs (Minckley et al. 1988).

**REPRODUCTION:** In Lake Mohave, spawning has been observed during the month of May, while in the upper Green River, spawning occurs in June and July at water temperatures of about 18$^{o}$C (64$^{o}$F) (Minckley 1973). Eggs are scattered over the bottom; no parental care occurs. Cold water released below dams precludes successful hatching of eggs (Bagley 1989).

**FOOD HABITS:** In rivers, adults eat primarily terrestrial insects, plant debris, and algae, while young bonytail eat aquatic insects. In lakes they apparently feed on algae and plankton.

**HABITAT:** Available information suggests that bonytail chub utilized the main stream portions of mid-sized to large rivers (both strong current and pools), usually over mud or rocks. During spring flooding they utilized the ponded and inundated terrestrial habitats. In

reservoirs, they occupy a variety of habitat types, but seem to appear to prefer the open water areas.

**ELEVATION:** Arizona records include elevations from 235 - 1,960 ft. (72 - 598 m).

**PLANT COMMUNITY:**

**POPULATION TRENDS:** Populations are declining; population sizes are small and consist of only a few adults greater than 40 years old. Population declines in this species are the result of habitat modification caused by dams. The conditions in which this fish now lives are very different from those in which it evolved (Bagley 1989).

## SPECIES PROTECTION AND CONSERVATION

**ENDANGERED SPECIES ACT STATUS:** LE (USDI, FWS 1980)
Determination of Critical Habitat (USDI, FWS 1994)

**STATE STATUS:** 1A (AGFD SWAP 2012)
[WSC, AGFD, WSCA in prep]
[Endangered, AGFD, TNW 1988]

**OTHER STATUS:** No Forest Service Status (USDA, FS Region 3 1999)
[Forest Service Sensitive, USDA, FS Region 3 1988]
Group 1 (NNDFW,NESL 1994, 2000, 2008)
E, probably Extinct in the wild of Mexico (NORMA Oficial Mexicana NOM-059-SEMARNAT-2010).
Listed Endangered (Secretaría de Medio Ambiente 2000).
[Listed Endangered Secretaría a de Desarrollo Social 1994]

**MANAGEMENT FACTORS:** USFWS 1990 Recovery Plan long term goals include: prevent extinction of bonytail chub in the wild, protect populations of bonytail chub and their habitats, reintroduce hatchery-reared bonytail chub into the wild, obtain essential information on the life history and habitat requirements of the bonytail chub, resolve taxonomic problems in Colorado River basin, promote and encourage improved communication and information dissemination, and develop quantitative recovery goals and a long term habitat protection strategy. In addition, Bagley (1989) states that habitat requirements must be determined, and water release-use modification must take place from dams to mimic condition necessary for successful spawning and development.

**Threats:** altered hydrology and cold tailwater releases from reservoirs; predation by and competition with nonnative fishes. **Management needs:** ameliorate effects of nonnative fish species in chub habitat; monitor status of chub populations; establish refugium populations in lakes Mohave, Havasu, and Mead.

**PROTECTIVE MEASURES TAKEN:** Critical habitat was established for bonytail chub in March, 1994. It designated portions of the Colorado, Green, and Yampa rivers in the upper basin and the Colorado River from Hoover Dam to Parker Dam (including Lake Mohave and Lake Havasu). The Bonytail Chub Recovery Plan was revised and approved September 4, 1990. Currently, a refugium for bonytail chub exists at Dexter National Fish Hatchery, New Mexico.

**SUGGESTED PROJECTS:** Continue survey activities on Lake Mohave, continue hatchery propagation at Dexter National Fish Hatchery, and continue working with grow-out facilities on Lake Mohave and Lake Havasu. Possible sites for additional refugia for bonytail chub include the Arizona Game and Fish Page Springs Hatchery; fish ponds at Ouray National Wildlife Refuge, Ouray, Utah; Buenos Aires National Wildlife Refuge, Sasabe, Arizona; Palm Lake at The Nature Conservancy's Hassayampa River Preserve, Wickenberg, Arizona; and Niland Native Fish Ponds, California.

**LAND MANAGEMENT/OWNERSHIP:** BOR; FWS - Bill Williams, Cibola, and Havasu National Wildlife Refuges; NPS - Lake Mead National Recreation Area; Lake Havasu State Park; La Paz County Park; TNC - Hassayampa River Preserve; Private.

## SOURCES OF FURTHER INFORMATION

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**ADDITIONAL INFORMATION:**

**Revised:** 1994-07-22 (WBJ)
1994-08-01 (SMS)
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